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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/527,873	03/17/2000	Sohaila Shooshtarian	AGX-37	4182

7590 06/19/2002
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EXAMINER

LEE, HSIEN MING

ART UNIT	PAPER NUMBER
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2823

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DATE MAILED: 06/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/527,873

Applicant(s)

SHOOSHTARIAN ET AL.

Examiner

Hsien-Ming Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 May 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 17.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's CPA request (actually it should be RCE) filed 5/30/02 is acknowledged.

Information Disclosure Statement

2. The information disclosure statement filed 1/18/02 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 4, 5, 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thankur et al. (US 5,926,742) in view of Gilchrist et al. (US 5,846,375).

Thankur et al. in Figs. 4, 5 and related text expressly and impliedly teaches the claimed method for heat treating a semiconductor wafer, comprising :

- * placing a semiconductor 10 in a thermal processing chamber 12 that is in communication with a plurality of lamps 18 (tungsten-halogen lamps), the semiconductor wafer 10 defining a plurality of localized regions (Fig. 5) along a radical axis;
- * adjusting the temperature of the semiconductor wafer 10 to a predetermined temperature according to a predetermined heat cycle including a heating stage in which the

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semiconductor wafer is heated by the plurality of lamps 18 and the radiation energy generated by the lamps can be selectively varied ;

* during at least one stage of the predetermined heat cycle, providing a gas through gas injection head 22 having multiple through-hole to minimize temperature deviation of the at least one localized region from the predetermined temperature. The localized regions comprises less than about 50% or 25% or 15% of a cross-section of the wafer. The predetermined heat cycle comprises a cooling stage.

Thankur et al fail to teach selectively controlling the localized temperature of at least one localized regions of the semiconductor wafer. Gilchrist et al. in an analogous art of heat treating a semiconductor wafer teach heating the wafer which is mounted on the surface of a chuck 14, wherein the chuck 14 has a series of embedded conduits 32a, 32b, 32c, 32d (Fig. 1). The fluid including heating gas (col. 5, lines 10-11) can be flown into the series of embedded conduits 32a, 32b, 32c, 32d to selectively control the localized temperature of at least one localized regions of the semiconductor wafer because each of conduits is independently controlled (col. 2, lines 63-65).

Therefore, at the time of the invention was made, one artisan in the art would have been motivated to modify the gas injection unit of Thankur et al. using the selectively-controlled-type gas injection unit of Gilchrist et al for the purpose of heat treating the semiconductor wafer since by this manner it would able to selectively control the localized temperature of localized regions of the semiconductor wafer, which in turn would minimize temperature deviation from a predetermined temperature.

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5. Claims 2, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thakur et al. and Gilchrist et al. as applied to claims 1, 4, 5, 8-13 above, and further in view of Moslehi (US 5,436,172) and applicants' admitted prior art (page 3, second paragraph).

Regarding claim 2, the combination of Thakur et al. and Gilchrist et al. substantially teach the claimed method but fails to teach monitoring the temperature of the localized regions with a temperature sensor in communication with a controller and based on information received by the controller from the temperature sensor controlling the temperature according to the predetermined heat cycle. Moslehi in an analogous art of heat treating a wafer teach utilizing a temperature sensor in communication with a controller to effectively control the temperature based on the information received by the controller (Figs. 2, 10, 18, 19, 22-23 and col. 3, line 48 through col. 4, line 5).

Therefore, at the time of the invention was made, one artisan in the art would have been motivated to utilize the temperature sensor and the controller of Moslehi in conjunction with the heating method of Thakur et al. and Gilchrist et al. for heat treating the wafer since by doing so it would able to effectively control temperatures in a real-time basis and thus to minimize temperature deviation.

Regarding claims 6 and 7, the combination of Thakur et al. and Gilchrist et al. does not expressly disclose that the temperature deviation is less than about 100C or about 25C.

However, it would have been obvious to one of the ordinary skill in the art to appreciate that in a conventional process of heat treating the wafer the temperature deviation on the wafer need to be controlled far less than 25C during the heating and cooling stages, as evidenced by applicants' admitted prior art, in which the prior art teaches that in a conventional heat treating process the


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localized temperature deviation is controlled about 5 C (page 3, lines 7-9), which is within the claimed range.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsien-Ming Lee whose telephone number is 703-305-7341. The examiner can normally be reached on M-F (9:00 ~ 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 703-308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-0142 for regular communications and 703-305-0142 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.


Hsien Ming Lee
June 8, 2002


LONG PHAM
PRIMARY EXAMINER